



## TOOL SUPPORT FOR LATHE

FIELD OF INVENTION

The present invention relates to a tool support provided for working a work piece at the working spindle of a lathe.

BACKGROUND OF THE INVENTION

Tool supports for tools to be mounted on the working spindle of a lathe are known and ~~serve~~ are useful for machining work pieces of any kind of material. Depending on the work to be performed, ~~the~~ appropriate tools have to be chosen and ~~to be~~ mounted ~~at~~ on the tool support. ~~An~~ This operation, ~~which is~~ often ~~is~~ very time consuming (secondary processing time). In order to avoid this very complicated ~~and process~~, complex turret heads with different tools are used.

BRIEF SUMMARY OF THE INVENTION

An object of the present invention ~~was~~ is to ~~elaborate provide~~ provide a tool support ~~which provides highest~~ having high precision with a very simple construction and which reduces the secondary processing time (re-tooling) practically to zero.

This object is achieved with a tool support of the type defined herein ~~above according to the present invention having the features of the characterizing part of claim 1.~~

Particularly advantageous embodiments of the invention are defined in the ~~depending~~ claims.

According to ~~this~~ the invention, the tool support enables ~~to hold~~ holding two different tools and ~~to selectively~~ selective use of the tools ~~them~~, keeping the cost of the constructive elements of the support and their number at ~~the~~ a minimum, particularly ~~if for moving the components of this support~~ when a single motor is used for ~~moving the components of the support, wherein having a driving a drive~~ shaft for displacing the slide and ~~also~~ selectively the desired tool support, ~~this~~. This is provided by the intermediary of a lever ~~with~~ having an inner control curve or two cam discs.

The ~~enforced~~ forced sequence of movement is made in a controlled manner, ~~sequentially~~ sequentially or simultaneously along the trajectory axis X and Y or by a translatory path. This ensures that the secondary processing time for the selection of ~~the~~ a tool is reduced to a minimum.

In order to carry out complicated working steps, it is possible to arrange several tool supports at the spindle (each with two different tools), preferably ~~with~~ at

angular spaces of  $120^\circ$ , which excludes on the one hand the risk of collision with a ~~neighbouring~~ neighboring tool and on the other hand reduces the secondary processing time for ~~the tools~~ tool selection to practically ~~to~~ zero.

~~Thanks~~ Due to this surprising concept, the productivity of a lathe can be substantially increased, keeping the cost at a low level.

If the tool supports are mounted on a longitudinally movable slide (tool slide), it is possible to ~~enlarge~~ expand the use of each double tool ~~additionally~~ in a further working plane (along the Z-axis).

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be herein after described in more detail on the basis of embodiments and sequences of movement represented in the ~~drawing~~ drawings. In the drawings:

Fig. 1        ~~represents~~ shows schematically essential components of a tool support in accordance with the invention;

Fig. 2        shows a tool support according to the invention having particularly advantageous driving means, ~~shows~~ in three different positions with regard to the spindle;

Fig. 3-8 ~~represents~~ shows schematically different operational possibilities ~~in a purely~~ schematical manner;

Fig. 9 shows a variant of a tool support according to a further aspect of the invention, and

Fig. 10-11 shows a combination of both tool support systems.

#### DETAILED DESCRIPTION OF THE INVENTION

Figure 1 ~~of the drawing~~ shows purely schematically a tool support, in accordance with the invention, having a central ~~driving~~ drive motor 1, and a ~~basic~~ base structure 8, on which a laterally displaceable slide 5 with two tool holders 6,6', is arranged. Different tools 9,9' are ~~hold~~ held in the holders 6,6'. Behind the cover 10, which is connected ~~with~~ to the slide 5 and which is displaceable, is arranged ~~the proper~~ drive ~~of the~~ control elements 2 and 3,3' (see ~~figure~~ Figure 2).

The ~~basic~~ base plate 8 is usually mounted on a Z-slide (not ~~represented~~ shown), thus allowing an additional controlled movement in the Z-direction (along the spindle).

Due to the additional Z-movements, further simultaneous ~~working~~ work operations are possible which permit, particularly for turning automats, a massive increase ~~of~~ in productivity.

Figure 2 illustrates schematically the operation principle of the double or twin tool support[[:]].

Motor 1 ~~drives~~ is driven by the intermediary of shaft 1' and the control elements, namely lever 2 and cam 3. The lever 2 with inner curve 2' ~~surves~~ serves to displace the slide 5 in a transverse direction (Y) until reaching adjustable stops 4 (e.g. ~~locking~~ locking screws), ~~such~~. Such limitation of the displacement path ~~serving~~ serves to bring the tools 9,9' into ~~their~~ a middle position (~~fig.~~ Figure 2 outside left). The two cams 3,3' serve to bring the desired tool ~~onto the~~ into a working diameter (in X-direction).

The shifting in the Y-direction can be performed as shown by means of lever 2 (up to the desired stop, ~~if~~. If the motor shaft continues to rotate the follower element of the inner curve ~~of the inner curve~~ of the lever is for further ~~advanced~~ advance against a spring force, ~~whilst~~ while the slide is stopped(, ~~or~~. Alternatively, a separate drive with a measuring system can be used (attacking, e.g., on the longitudinal side of the slide).

Figure 2 further shows that after adjusting the middle position of the slide 5 (left side), the stop for the right side tool 9' is approached (middle) and, thereafter, the tool 9' is moved over the one cam 3' into its working position in the direction of the spindle 7.

The feed of the tools 9,9' by means of the corresponding cams 3,3' is carried out by the ~~attack~~ action of the cams on an extension of the tool holders 6,6'. The latter are moved against a resetting force (a spring, not ~~represented~~ shown), such that any tool which is not being controlled by the cam remains always out of its working position. The motor shaft 1', departing from the middle position, can be rotated in both directions up to 180°.

As already mentioned, it is possible to arrange a plurality of tool supports around a spindle whereby the described advantages can be used in multiple manners. The increase in performance allows ~~to replace~~ replacement of the curve-controlled turning automats which up to now ~~where held~~ as were considered "irreplaceable".

Figures 3-8 show different operational possibilities.

~~Also~~ Another object of the invention is a tool support as shown in Fig. 9, which is equipped with a lever 20 which can be rotated around an axis by a motor drive, having at its free end a turret head 30 for tools. ~~Thanks~~ Due to the rotatable lever 20 (Y-axis), the head 30 is adjustable in ~~its~~ height (A) in a very simple manner, thereby guaranteeing ~~a~~ high precision.

The tool support with ~~that~~ rotatable arm 20 is displaceable, if mounted on a lathe, preferably in a

longitudinal and transverse direction with respect to the spindle (X-axis and Z-axis).

This tool support is particularly suitable for ~~being used~~ use in combination with ~~that the~~ tool support described herein before, leading to a particularly versatile application of ~~the~~ different tools, ~~such~~ possible applications ~~are being~~ schematically ~~represented~~ shown in ~~fig.~~ Figures 10 and 11.